

Steven S. McConnell

Research Engineer, Center for Transportation Research
Energy Systems Division (ES)
Argonne National Laboratory (ANL)

Professional Experience:

October 2001-Present Research Engineer, Center for Transportation Research,
Argonne National Laboratory

Principal Investigator responsible for developing a variable composition intake air system for the reduction of oxide of nitrogen emissions in heavy-duty vehicles and off-road engines. Key responsibilities are the evaluation and interpretation of data, test planning and scheduling, report generation and coordination of testing and hardware with Mack Trucks and gas separation membrane suppliers. All data was acquired under the auspices of a DOE Cooperative Research And Development Agreement (CRADA) contract, meaning the sponsor holds all publication rights to the data.

Principal Investigator for Energy System Division HCCI engine project. This project pursues the goal of providing a homogenous charged compression ignition (HCCI) engine operation on reformed ethanol. Responsible for project management, including design, fabrication and testing of the HCCI engine and components. Also responsible for writing the LDRD proposal, project reports and final review as well as publications and presentations related to this project. (January 2004-Present)

Principal Investigator responsible for the Locomotive Common Rail Injection Fuel Spray Visualization Testing Program. Key responsibilities are the evaluation and interpretation of data, test planning and scheduling, report generation and coordination of testing and hardware with EMD. Responsibilities also include test hardware development and equipment calibration. All data is acquired under contract with DOE's Locomotive Efficiency Improvement and Emissions Reduction Program. Also responsible for writing publications and giving presentations of technical material related to this project. (August 2003-Present)

Principal Investigator responsible for developing a variable composition intake air system for the reduction of oxide of nitrogen emissions in Natural Gas Engines. Key responsibilities are the evaluation and interpretation of data, test planning and scheduling, report generation. Also responsible for writing publications and giving presentations of technical material related to this project. (June 2003-Present)

Judge for the 2003 FutureTruck competition. Key responsibilities were the evaluation and judging of the technical reports generated by the student teams. (May 2003)

Principal Investigator for the EMD 710 locomotive engine project. Responsible for project management, which includes calibrating engine diagnostic equipment such as emissions benches, fuel measurement systems, and engine control systems. Responsible for troubleshooting diagnostic equipment to insure data quality. Also responsible for running the engine, taking performance and emissions data, analyzing data and reporting data to the industrial sponsor (EMD). All data was acquired under the auspices of a DOE Work-For-Others (WFO) contract, meaning the sponsor holds all publication rights to the data. (February 2003-Present)

Assistant Researcher responsible for the testing of the EMD H engine test program. Responsible for calibrating engine diagnostic equipment such as emissions benches, fuel measurement systems, and engine control systems and troubleshooting diagnostic equipment to insure data quality. Also responsible for running the engine, taking performance and emissions data. All data was acquired under the auspices of a DOE Work-For-Others (WFO) contract, meaning the sponsor holds all publication rights to the data. (February 2003-Present)

Co-Chair of the "National Laboratory CIDI and Fuel R&D Merit Review and Peer Evaluation" Meeting held May 14-16, 2002.

October 1998-October 2001 Project Engineer, Automotive Testing Laboratories, Inc

Managed the design and modification of Engine Testing Services Facilities to support proprietary engine design, research and development, and the testing of hybrid vehicle technologies. Authored and developed technical proposals and performed marketing functions allowing the company to obtain principal contracts. Accountable for fundamental engine development and design to lower emissions and increase thermal efficiency. Accountable for the design of parts for hybrid vehicle technology research including emissions reduction aftertreatment. Responsible for conceptualization, design, and execution of engine configuration changes to modify combustion types. Designed and installed upgrades to the data acquisition system. Supervised lab staff in acquisition and certification of combustion test data. Responsible for accuracy and credibility of research data analysis. Project Manager of proprietary engine testing during research and development phases. Managed testing of all hybrid vehicle technology research results. Designed, fabricated and verified a 15-hp AC dynamometer for proprietary engine research. Modified a chassis test cell for heavy and light duty non-road engine testing. Certified non-road engines for use in generators to both the EPA and MSHA emissions standards.

October 1997-October 1998 Hardware Engineer, Lockheed Martin

Participated in the design of a medium resolution reconfigurable flight simulator capable of being configured as either a fixed wing or rotary wing aircraft. Responsibilities included the design of parts for the control and reconfiguration of the simulator. Responsible for the design and packaging of electro-mechanical systems in the pilots console and the center avionics pedestal of a high fidelity T1-A Avionics trainer.

September 1995-September 1997 Engineering Scientist, West Virginia University

Primarily worked on the Heavy Duty Transportable Emissions Lab where responsibilities were the testing of alternatively fueled vehicles for the Department of Energy. Emissions and Efficiency testing included vehicles fueled with CNG, LNG, Bio-diesel, Methanol and Ethanol. Also responsible for the coordination between fleet managers and WVU to reduce downtime for both the vehicle fleets and the lab. Other responsibilities included quality control, data reduction and overseeing maintenance of the lab. Responsible for the emissions testing of a liquid fueled fuel cell powered transit bus on three different transit cycles and a fourth specialized cycle as well as steady state testing of the reformer. Developed the test protocol and designed the testing equipment for the evaluation of a hybrid fuel cell bus. Developed the New York Cycle Garbage Collection Cycle use to evaluate the emissions from

garbage trucks operating with LNG, CNG and Diesel fuel. Performed a study using data from several transit busses and over the road tractors to find a relationship between particulate matter measurements taken during a central business district cycle chassis test and opacity measurements from standard curbside snap tests.

1993-1995 Graduate Research Assistant, West Virginia University

Designed and fabricated the WVU Medium Duty Transportable Emissions testing Laboratory to federal specifications as well as components for the WVU Heavy Duty Mobile emissions testing Laboratory and the Stationary Emissions testing Laboratory. Designed an air handling system for a heavy-duty stationary engine test cell to meet the requirements of the federal register. Participated in a particulate matter deposition study where responsibilities were the instrumentation of a 4000 SCFM dilution tunnel to examine the effects of temperature on the accuracy of particulate matter measurements.

September 1992-May 1993 Senior Project, Formula SAE Competition, West Virginia University

Ergonomics and Controls Team Leader and Crew Chief, optimized steering and chassis components for weight and strength, performed an impact analysis of the chassis and safety features using finite element analysis, implemented the use of advanced materials and composites. Organized and performed testing of the racecar, managed and conducted maintenance.

May 1987-May 1990 Draftsman/Designer, Daedalean Inc.

Designed mechanical parts, oversaw a work force of three in the production of level three drawing packages using DOD standards, performed physical configuration and factory acceptance audits, performed QA audits.

Education:

Master of Science, Mechanical Engineering, 1995

West Virginia University, Morgantown WV

Thesis: Flywheel Inertia System Design for a Medium Duty Transportable Chassis Dynamometer

Bachelor of Science, Mechanical Engineering, 1993

West Virginia University, Morgantown WV

Professional Society Activities:

Society of Automotive Engineers

- Member of the Heavy Duty Hybrid Testing (J2711) Standards Committee.
- Organizer and Chairperson of the Society of Automotive Engineers Diesel Emissions Session for 2002 Spring Fuels and Lubricants Conference.
- Chairperson of the Real World Emissions Measurement Session for 2002 Spring Fuels and Lubricants Conference.

- Organizer and Chairperson of the Society of Automotive Engineers Diesel Particulate Matter Emissions Session for 2003 Fall Fuels and Lubricants Conference

Passed the EIT exam on July 12, 1993.

Publications: Peer Reviewed Conference Papers

Micheal L. Traver, Christopher J. Tennant, Thomas I. McDaniel, Steven S. McConnell, "Interlaboratory Cross-Check of Heavy-Duty Vehicle Chassis Dynamometers," October 2002, SAE Publication 2002-01-2879

McConnell, S., McKain, D, Clark, N., Lyons, D, Wimmer, R, Fletcher, J, "Emissions Testing of a Hybrid Fuel Cell Bus," February 1998, SAE Publication 980680.

Publications: Other Reports and Documents

"The Design of a Medium Duty Chassis Dynamometer" Masters Thesis

"Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines – Membrane A" Report sent to DOE and Mack Trucks

"Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines – Membrane B" Report sent to DOE, Mack Trucks and Prism Membranes

"Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines – Membrane C" Report sent to DOE, Mack Trucks and Parker Hannifin Membranes

"Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines – Membrane D" Report sent to DOE, Mack Trucks and Innovative Membranes

"Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines – Membrane E" Report sent to DOE, Mack Trucks and Compact Membrane Systems

Presentations:

McConnell, S, *Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (October 2001)

McConnell, S, *Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Prism Membranes Inc. (November 2001)

McConnell, S, *Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Medal Inc. (December 2001)

McConnell, S, *Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (April 2002)

McConnell, S, *Homogeneous Charge Compression Ignition*, presented to Argonne National Laboratories LDRD Committee. (September 2003)

McConnell, S, *Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (October 2002)

McConnell, S, *Evaluation of Nitrogen-Enriched Intake Air as an Alternative to EGR for NO_x Reduction* presented to distinguished members of Illinois University of Chicago. (November 2002)

McConnell, S, *INTERLABORATORY CROSSCHECK OF HEAVY-DUTY VEHICLE CHASSIS DYNAMOMETERS*, presented to members of the SAE J2711 Heavy Duty Hybrid Testing Standards Committee. (November 2002)

McConnell, S, *Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (January 2003)

McConnell, S, *Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to the DOE Advanced Combustion Peer Review. (May 2003)

McConnell, S, *Status Review Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (May 2003)

McConnell, S, *Status Review of Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (August 2003)

McConnell, S, *Homogeneous Charge Compression Ignition*, presented to Argonne National Laboratories Transportation Working Group. (September 2003)

McConnell, S, *Status Review of Nitrogen Enriched Air for the Reduction of NO_x Emissions In Heavy Duty Diesel Engines*, presented to representatives of Mack Trucks Inc., Volvo Trucks and Renault. (December 2003)